

WHAT IS CLAIMED IS:

1 1. A maintenance mechanism for a print head having a nozzle surface in
2 which are formed a plurality of nozzles, comprising:

3 a head cap, reciprocally movable between a capping position for
4 covering the nozzles and a retracted position separated from the nozzle
5 surface;

6 a pump, connected to the head cap;

7 a drive source;

8 a pump gear, rotated by the drive source to drive the pump;

9 a cylindrical cam, reciprocally rotatable between a first position and a
10 second position to reciprocally move the head cap; and

11 a frictional clutch, which rotates the cylindrical cam together with the
12 pump gear, but rotates only the pump gear when the cylindrical cam reaches
13 each one of the first position and the second position.

1 2. The maintenance mechanism as set forth in claim 1, wherein:

2 a cam groove is formed on an outer peripheral surface of the
3 cylindrical cam in a predetermined circumferential angular range; and

4 the maintenance mechanism further comprises a cap driving pin
5 slidably movable along the cam groove to reciprocally move the head cap.

1 3. The maintenance mechanism as set forth in claim 1, wherein:

2 a first engagement member and a second engagement member are
3 provided with the cylindrical cam, and a third engagement member is disposed

4 at a predetermined position; and

5 a rotation of the cylindrical cam in a first direction is stopped when the
6 first engagement member engages with the third engagement member, and a
7 rotation of the cylindrical cam in a second direction is stopped when the
8 second engagement member engages with the third engagement member.

1 4. The maintenance mechanism as set forth in claim 2, wherein a
2 rotation of the cylindrical cam in a first direction is stopped when the cap
3 driving pin reaches at a first dead end of the cam groove, and a rotation of the
4 cylindrical cam in a second direction is stopped when the cap driving pin
5 reaches at a second dead end of the cam groove.

1 5. The maintenance mechanism as set forth in claim 3 or 4, wherein the
2 pump gear and the cylindrical cam are coaxially arranged.

1 6. The maintenance mechanism as set forth in claim 5, wherein the
2 frictional clutch includes an urging member which presses one circular end
3 surface of the pump gear and one circular end surface of the cylindrical cam
4 together.

1 7. The maintenance mechanism as set forth in claim 3 or 4, wherein the
2 pump is a tube pump which performs a sucking operation only when the
3 cylindrical cam is rotated in either one of the first direction and the second
4 direction.

1 8. The maintenance mechanism as set forth in claim 2, wherein the
2 head cap includes:

3 a cap body having an opening which faces the nozzle surface;
4 a cap holder, which holds the cap body;
5 an urging member, disposed in the cap holder to urge the cap body in
6 a direction that the cap body is projected from the cap holder; and
7 a vent valve, closed when the cap body of the head cap placed at the
8 capping position is pushed toward the cap holder by a predetermined amount
9 against an urging force of the urging member, so that an interior space of the
10 head cap is isolated from atmosphere.

1 9. The maintenance mechanism as set forth in claim 8, wherein the cam
2 groove includes:

3 a first portion which moves the cap driving pin so as to place the cap
4 holder at a first capping position where the cap body covers the nozzles and
5 the vent valve is closed; and
6 a second portion which moves the cap driving pin so as to place the
7 cap holder at a second capping position where the cap body covers the
8 nozzles and the vent valve is opened.

1 10. The maintenance mechanism as set forth in claim 9, wherein:
2 the cam groove includes a guide portion which guides the cap driving
3 pin situated in the first portion to the second portion; and
4 wherein the cap driving pin situated in the vicinity of one end of the
5 first portion is guided to the second portion via the guide portion, when the cap

6 driving pin is moved away from the one end of the first portion.

1 11. The maintenance mechanism as set forth in claim 10, wherein:
2 the first portion includes a depth-decreasing portion in which a depth
3 thereof gradually decreases toward the one end thereof; and
4 the guide portion connects a part in the first portion in the vicinity of
5 the depth-decreasing portion and the second portion.

1 12. The maintenance mechanism as set forth in claim 2, wherein the cam
2 groove is one continuous groove, and the predetermined circumferential
3 angular range is 360 degrees or less.

1 13. The maintenance mechanism as set forth in claim 1, further
2 comprising an intermittent gear arranged coaxially with the cylindrical cam, so
3 as to rotate integrally with the cylindrical cam,

4 wherein a driving force of the drive source is transmitted to the
5 intermittent gear only in a predetermined circumferential angular range of the
6 cylindrical cam between the first position and the second position.

1 14. The maintenance mechanism as set forth in claim 2, further
2 comprising:

3 a wiper, reciprocally movable between a wiping position for wiping the
4 nozzle surface and a standby position; and

5 a wiper driving pin, slidably moving along the cam groove to
6 reciprocally move the wiper,

7 wherein the cam groove includes:

8 a first dead end portion, at which the wiper driving pin is placed

9 when a rotation of the cylindrical cam in a first direction is stopped;

10 a wiper driving portion, continued from the first dead end portion,

11 which moves the wiper driving pin to reciprocally move the wiper;

12 a second dead end portion, at which the cap driving pin is placed

13 when a rotation of the cylindrical cam in a second direction is stopped; and

14 a cap driving portion, continued from the second dead end portion,

15 which moves the cap driving pin to reciprocally move the head cap.

1 15. The maintenance mechanism as set forth in claim 14, wherein the

2 pump is a tube pump which performs a sucking operation only when the

3 cylindrical cam is rotated in the second direction.

5 16. The maintenance mechanism as set forth in claim 7, wherein the

 pump is arranged coaxially with the cylindrical cam.

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1 17. The maintenance mechanism as set forth in claim 15, wherein the

2 pump is arranged coaxially with the cylindrical cam.

1 18. The maintenance mechanism as set forth in claim 2, further

2 comprising an urging member which urges the cap driving pin toward a bottom

3 surface of the cam groove.

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1 19. The maintenance mechanism as set forth in claim 14, further
2 comprising an intermittent gear arranged coaxially with the cylindrical cam, so
3 as to rotate integrally with the cylindrical cam,

4 wherein a driving force of the drive source is transmitted to the
5 intermittent gear only in a predetermined circumferential angular range of the
6 cylindrical cam between the first dead end portion and the second dead end
7 portion of the cam groove.

1 20. An ink jet printer comprising the maintenance mechanism as set forth
2 in claim 1.